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ELECTRIC
POWER
ANNUAL
REPORT

HISTORY
1982 - 86

PROJECTIONS
1987 - 96

A REPORT OF THE
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A REPORT OF THE STATISTICS DEPARTMENT OF THE EDISON ELECTRIC INSTITUTE

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U.S. REGIONS OF THE NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

IDENTIFICATION OF RELIABILITY COUNCILS:

ECAR—East Central Area Reliability Coordination Agreement
ERCOT—Electric Reliability Council of Texas
MAAC—Mid-Atlantic Area Council
MAIN—Mid-America Interpool Network

MAPP—Mid-continent Area Power Pool
NPCC—Northeast Power Coordinating Council
SERC—Southeastern Electric Reliability Council
SPP—Southwest Power Pool
WSCC—Western Systems Coordinating Council

The electric utility systems of the United States are normally operated as three separate interconnected areas: the Eastern Interconnection, the Electric Reliability Council of Texas (ERCOT), and the Western Systems Coordinating Council (WSCC). Generating

capacity available in one of these areas is not usually available to any other area. Also, generating capacity in one of the interconnected areas may not be available to serve load throughout that area due to various internal constraints.



TABLE OF CONTENTS

Contributors to the 1986 ELECTRIC POWER ANNUAL REPORT.....	1
U.S. Regions of the North American Electric Reliability Council.....	2
Table of Contents.....	3
Foreword.....	4
Definitions and Methods of Summarization.....	5

Part I. Electric Power Supply History, 1982-1986

Industry Performance in 1986: Installation of New Capacity; Capabilities, Peak Loads, Margins and Energy Requirements.....	6
Table 1 - Historical Summer Values.....	7
Table 2 - Historical Winter Values.....	8
Table 3 - Summer Peak Loads Expressed as Percentage of Peak Load for the Following Winter, 1974-1986.....	9
Annual Energy Requirements and Annual Load Factors, 1982-1986	
Table 4 - Historical Energy Requirements.....	10
Table 5 - Historical Annual Load Factors.....	10
Table 6 - Changes in Scheduled Operation of Nuclear and Fossil-Fired Steam Turbine-Generators, Removed from Schedule and Delayed One Year or More Between January 1, 1986 and January 1, 1987.....	11
Additions to Generating Capability During 1986.....	12
Table 7 - Summary Totals of 1986 Additions.....	12
Table 8 - Listing of Individual Projects.....	13
Table 9 - Nuclear Electric Power Units In Service.....	15

Part II. Electric Power Supply Projections, 1987-1996

Summer Peak Capabilities, Peak Loads, & Percent Capacity Margins...	18
Table 10 - Summer Projections.....	19
Winter Peak Capabilities, Peak Loads, & Percent Capacity Margins...	20
Table 11 - Winter Projections.....	21
Relationship Between Summer and Winter Peak Loads, 1987-1996.....	22
Table 12 - Summer Peak Loads Expressed as Percentage of Peak Loads for the Following Winter, 1987-1996.....	22
Table 13 - Projected Energy Requirements.....	23
Table 14 - Projected Annual Load Factors, Percentage.....	23

Future Expansion Program.....	24
Table 15 - Scheduled Conventional and Nuclear Steam Turbine-Generators By Size Range.....	24
Table 16 - Summary Totals of Scheduled Additions.....	25
Table 17 - Listing of Individual Projects.....	26

Part III. Manufacture of Heavy Electric Power Equipment (Historical and Scheduled)

Table 18 - Capacities of Various Types of Equipment Ordered by U.S. Electric Utility Systems, 1982-1986.....	30
Table 19 - Manufacture of Steam and Hydraulic Units 4,000 kW and Larger.....	31
Table 20 - Manufacture of Steam Turbine-Generators 4,000 kW and Larger.....	32
Table 20A - Manufacture of Conventional Steam Turbine-Generators 4,000 kW and Larger.....	33
Table 20B - Manufacture of Nuclear Steam Turbine-Generators 4,000 kW and Larger.....	34
Table 21 - Manufacture of Generators for Hydraulic Turbines 4,000 kW and Larger.....	35
Table 22 - Manufacture of Conventional Steam Generators 450 Psi. Pressure and Higher.....	36
Table 23 - Manufacture of Hydraulic Turbines 5,000 Horsepower and Larger.....	37
Table 24 - Manufacture of Combustion Turbine- Generators 4,000 kW and Larger.....	38
Table 25 - Manufacture of Nuclear Power Reactors 50,000 kW and Larger.....	39
Table 26 - Manufacture of Power Transformers 501 kVA and Larger.....	40

1986 ELECTRIC POWER ANNUAL REPORT

FOREWORD

This 1986 ELECTRIC POWER ANNUAL REPORT presents information concerning the electric power supply, expansion of electric generating facilities, and the manufacture of heavy electric power equipment in the United States as of the end of 1986.

The report is divided into three parts. Part I covers the history of electric power supply from 1982 through 1986. Part II pertains to projected power supply values from 1987 through 1996. Part III has to do with the planned domestic manufacture and importation of heavy electric power equipment as of January 1, 1987.

The historical data from 1982 through 1986 are an accurate presentation of the peak load, capability installed to meet load, and energy requirements for these time periods. The electric power supply data shown in Parts I and II of this report are derived from IE-411 reports for previous years submitted to the Department of Energy and to the North American Electric Reliability Council (NERC).

Forecast values used herein were obtained from IE-411 reports and from the advance release of ELECTRIC POWER SUPPLY & DEMAND 1987-1996 published by NERC in May of 1987. Installed capability, peak load and percent capacity margin values shown in this report for the summer of 1986 update the preliminary actual values published in EEL's 1986 POST-SUMMER ELECTRIC POWER SURVEY. In conformity with NERC's practice, projected peak load values are not reduced by the amount of interruptible contracts.

Data in this report represent the total electric utility industry of the lower 48 states, including Investor-Owned systems and those of governmental agencies--Federal, Municipal and State & Local--and also Rural Electric Cooperatives.

The reported data include some industrial power installations whose operations are coordinated with the utility systems with which they are interconnected and which thereby contribute to the public supply. The data do not include any isolated industrial or institutional power installations.

Data pertaining to power system capabilities, peak loads, percent capacity margins, and energy requirements are presented for each of the nine reliability councils of NERC. Boundaries of the nine reliability councils are shown by the map in Fig. 1. The North American Electric Reliability Council encompasses essentially all utility systems in the United States and five Canadian provinces, but the data presented in this report cover only the systems in the contiguous United States.

Part III of this report presents the results of the semi-annual survey on the manufacture and scheduling of heavy electric power equipment as of January 1, 1987, made by the Statistics Department of the Edison Electric Institute. Contributors to the survey include representatives of the electric utility industry throughout the contiguous United States, the nation's principal manufacturers of heavy electric power equipment, and those foreign manufacturers supplying electric generating equipment to U.S. electric utility systems.

The Edison Electric Institute is the only organization servicing the electric utility and allied industries that conducts surveys on the manufacture and scheduling of heavy electric power equipment on a semi-annual basis. These surveys are also unique in that information on each planned project is cross-checked with both the manufacturer and the system ordering the equipment. Furthermore, the time-frame for ordered and scheduled units is not limited to ten years, but extends into the future as far out as equipment is officially ordered and scheduled for installation. The resulting data file also allows the semi-annual tracking of unit slippages and cancellations.

Projections presented in this report are based on the best information available from the turn of the year through the end of the first quarter of 1987. There could, however, be delays in the installation of scheduled capacity and reductions in the percent capacity margins. To assure an adequate bulk electric power supply into the 1990s, it is essential that the installation of both nuclear and coal-fired generating units proceed as currently scheduled and that conservation and load management programs be pursued at the same time.

Definitions of the terms used in this report, together with information concerning methods of summarizing the data, appear on the following page.

DEFINITIONS AND METHODS OF SUMMARIZATION

INSTALLED CAPABILITY is the maximum load which a generating unit or a group of units can carry under specified conditions for a given period of time. Installed capability values are shown in the historical summer and winter tables.

CAPABILITY, as projected in this report, is equivalent to Planned Resources, defined by the North American Electric Reliability Council to include the total installed generating capacity which is existing, presently under construction, or in various states of planning; plus scheduled capacity purchases, less scheduled capacity sales; less total generating capacity out of service in deactivated shutdown status. This capability must provide for the projected load plus scheduled maintenance, forced outages, system operating requirements, and any unforeseen load. The capabilities of all systems normally interconnected are based upon fully coordinated operation. Peak capability refers to the maximum capability, as defined above, at the approximate time and for the duration of the load referred to, that is, at the time of the summer peak load or the winter peak load. Regional capability, as reported herein, is the sum of the capabilities of the systems serving the region.

PEAK LOAD for a region may be either coincident or non-coincident. It is the sum of the actual or projected peak load of the electric utilities and any self-generating industrial facilities.

HISTORICAL AND PROJECTED INSTALLED MARGIN shown on the summer and winter tables represents the difference between installed capability and peak load. It is the margin available to replace generating equipment out of service due to planned scheduled maintenance, forced outages, and equipment deratings due to various causes. In addition, installed margin must provide an operating reserve to cover variations in peak load and to regulate frequency and control transmission tie-line schedules.

PERCENT CAPACITY MARGIN is the installed margin divided by capability multiplied by 100.

CAVEATS Because some maximum regional loads may occur in winter rather than in summer, the installed margin for the country as a whole is not necessarily valid with respect to the electric power situation at a particular time.

It is also true that regional installed capacity margins (and hence the installed margin for the sum of the regions) in summer or winter have not always represented the minimum or the maximum margin. The extremes of installed capacity margins may be influenced, for example, by the date of bringing new large generating facilities into commercial operation in relation to the time of the annual peak loads--the addition of a very large generating unit just before the peak could give a larger margin during the peak period than that which existed before the time of peak. Also, in areas having high proportions of hydroelectric generating capacity, the lowest margins may occur at times other than when the load is at a maximum because of low capability resulting from minimum water for power generation.

The adequacy of projected power supply cannot be judged solely by the use of installed capacity margins without proper recognition of the potential impact of planned and forced outages of generating equipment. There have been several occasions within the past 15 years when the entire installed margin has been utilized to offset such outages of generating equipment, resulting in system-wide voltage reductions, interruption of interruptible loads, public appeals, and some interruption of firm customer load.

LOAD FACTOR is the ratio of the megawatt-hour output supplied during a designated period to the output that would have occurred had the peak experienced during that period been constant throughout the period. For example, annual percent load factor is calculated by multiplying annual megawatt-hour requirements by 100 and dividing by the product of the annual peak load and the number of hours in a year (8,760 in normal years, 8,784 in leap years).

TOTAL U.S., as used in this publication, is equivalent to the lower forty-eight contiguous states; Alaska and Hawaii are omitted.

AVERAGE ANNUAL COMPOUND GROWTH RATES are calculated on a point-to-point basis, either by taking the fourth root of the difference between the values for the first and fifth historical years in Tables 1, 2, and 4, or the ninth root of the difference between the first and tenth projected years in Tables 10, 11, and 13.

PART 1. ELECTRIC POWER SUPPLY 1982-1986

INSTALLATION OF NEW CAPACITY; CAPABILITIES, PEAK LOADS, MARGINS, AND ENERGY REQUIREMENTS

INDUSTRY PERFORMANCE IN 1986

During the year 1986 the electric utility systems of the contiguous United States placed 15.4 thousand megawatts of additional electric generating capacity into commercial operation, as shown in Table 7. This includes all units of 4 megawatts capacity and larger. Of this total, 4 units with capability ratings aggregating 250 megawatts were hydraulic, and 27 units totaling 15.1 thousand megawatts were thermal. Eight of the thermal units were powered by nuclear fuel, and 13 were conventional steam turbine-generators. The individual generating units that make up the 15.4-thousand megawatts added during 1986 are identified in the actual additions listing on page 13.

This newly added capacity contributed to the increase in the total capability, or load-carrying ability, of the U.S. electric utility systems to 646.7 thousand megawatts at the

year end--an increase of 1.6 percent over the total at the end of 1985.

Of the total capability of 646.7 thousand megawatts, approximately 88 percent is thermal and the rest is hydraulic. During the past five years the total capability of the country's electric utility systems has increased at an average annual rate of 2.0 percent.

The combined 1986 summer peak load, shown in Table 1 of this report, was 476.3 thousand megawatts or 12.6 percent higher than the 1986/87 winter peak load. This is the twenty-third consecutive year during which the combined summer peak load exceeded the peak of the following winter. The point-to-point compound average annual increase between the 1982 and 1986 summer peak loads was 3.5 percent.

Table 2 shows that the combined winter 1986/87 peak load of the contiguous United States was 422.9 thousand megawatts--0.2 percent below the winter 1985/86 peak load. The change in peak load during the past five years, from winter 1982/83, was a net increase of 48.9 thousand megawatts, and is equivalent to an average annual increase of 3.1 percent on a point-to-point compounded basis.

As can be seen from Table 4, during 1986 the energy requirements for the contiguous United States amounted to 2.5 billion megawatthours--1.3 percent higher than the output for 1985. The point-to-point compound average annual increase between 1982 and 1986 for energy requirements was 2.9 percent.

The 1986 annual load factor for the sum of the nine regions was 60.7 percent.

Table 1 - SUMMER INSTALLED CAPABILITIES, PEAK LOADS, INSTALLED MARGINS & PERCENT CAPACITY MARGINS (Megawatts)

Regions		1982	1983	1984	1985	1986	86/85 % Chg	Growth Rate 1982-1986*
NPCC	Installed Capability	50,563	50,508	51,312	51,319	51,879	1.1	0.6%
	Peak Load	36,427	37,627	38,144	40,010	39,026	-2.5	1.7%
	Installed Margin	14,136	12,881	13,168	11,309	12,853		
	Capacity Margin	28.0%	25.5%	25.7%	22.0%	24.8%		
MAAC	Installed Capability	46,461	46,734	46,183	47,157	47,626	1.0	0.6%
	Peak Load	33,846	34,783	35,442	37,053	37,527	1.3	2.6%
	Installed Margin	12,615	11,951	10,741	10,104	10,099		
	Capacity Margin	27.2%	25.6%	23.3%	21.4%	21.2%		
ECAR	Installed Capability	89,919	90,914	90,115	92,960	95,201	2.4	1.4%
	Peak Load	59,668	65,959	65,851	66,293	69,253	4.5	3.8%
	Installed Margin	30,251	24,955	24,264	26,667	25,948		
	Capacity Margin	33.6%	27.4%	26.9%	28.7%	27.3%		
SERC	Installed Capability	121,533	124,999	127,562	131,437	132,168	0.6	2.1%
	Peak Load	86,229	97,235	93,400	98,572	104,328	5.8	4.9%
	Installed Margin	35,304	27,764	34,162	32,865	27,840		
	Capacity Margin	29.0%	22.2%	26.8%	25.0%	21.1%		
MAIN	Installed Capability	40,578	40,797	41,608	44,568	45,351	1.8	2.8%
	Peak Load	31,394	34,704	35,106	32,432	35,968	10.9	3.5%
	Installed Margin	9,184	6,093	6,502	12,136	9,383		
	Capacity Margin	22.6%	14.9%	15.4%	27.2%	20.7%		
SPP	Installed Capability	58,236	59,294	60,389	62,225	65,102	4.6	2.8%
	Peak Load	43,064	45,881	45,562	45,026	47,532	5.6	2.5%
	Installed Margin	15,172	13,413	14,827	17,199	17,570		
	Capacity Margin	26.1%	22.6%	24.6%	27.6%	27.0%		
ERCOT	Installed Capability	43,452	43,800	44,056	43,829	43,386	-1.0	0.0%
	Peak Load	33,231	34,972	36,851	38,062	39,140	2.8	4.2%
	Installed Margin	10,221	8,828	7,205	5,767	4,246		
	Capacity Margin	23.5%	20.2%	16.4%	13.2%	9.8%		
MAPP	Installed Capability	27,331	27,952	28,161	28,685	28,438	-0.9	1.0%
	Peak Load	19,470	20,785	20,666	19,936	21,245	6.6	2.2%
	Installed Margin	7,861	7,167	7,495	8,749	7,193		
	Capacity Margin	28.8%	25.6%	26.6%	30.5%	25.3%		
WSCC	Installed Capability	108,069	111,451	114,854	119,417	124,140	4.0	3.5%
	Peak Load	72,289	75,580	80,048	83,119	82,301	-1.0	3.3%
	Installed Margin	35,780	35,871	34,806	36,298	41,839		
	Capacity Margin	33.1%	32.2%	30.3%	30.4%	33.7%		
TOTAL UNITED STATES**	Installed Capability	586,142	596,449	604,240	621,597	633,291	1.9	2.0%
	Peak Load	415,618	447,526	451,150	460,503	476,320	3.4	3.5%
	Installed Margin	170,524	148,923	153,090	161,094	156,971		
	Capacity Margin	29.1%	25.0%	25.3%	25.9%	24.8%		

* Compound annual growth rate from 1982 to 1986.

** U.S. totals are meaningless and should not be used for policy purposes.

NOTE: For definitions of terms see page 5.

Table 2 - WINTER INSTALLED CAPABILITIES, PEAK LOADS, INSTALLED MARGINS & PERCENT CAPACITY MARGINS (Megawatts)

Regions		1982/83	1983/84	1984/85	1985/86	1986/87	86/85 % Chg	Growth Rate 1982-1986*
NPCC	Installed Capability	52,289	52,018	53,076	52,984	53,418	0.8	0.5%
	Peak Load	34,755	35,836	37,321	38,233	37,976	-0.7	2.2%
	Installed Margin	17,534	16,182	15,755	14,751	15,442		
	Capacity Margin	33.5%	31.1%	29.7%	27.8%	28.9%		
MAAC	Installed Capability	48,330	49,283	49,646	49,715	49,978	0.5	0.8%
	Peak Load	28,197	30,150	33,384	31,652	32,807	3.6	3.9%
	Installed Margin	20,133	19,133	16,262	18,063	17,171		
	Capacity Margin	41.7%	38.8%	32.8%	36.3%	34.4%		
ECAR	Installed Capability	91,045	91,642	94,304	95,750	96,664	1.0	1.5%
	Peak Load	56,559	63,820	67,349	65,667	64,561	-1.7	3.4%
	Installed Margin	34,486	27,822	26,955	30,083	32,103		
	Capacity Margin	37.9%	30.4%	28.6%	31.4%	33.2%		
SERC	Installed Capability	125,575	129,941	129,105	134,754	135,482	0.5	1.9%
	Peak Load	85,664	91,459	106,837	97,854	101,849	4.1	4.4%
	Installed Margin	39,911	38,482	22,268	36,900	33,633		
	Capacity Margin	31.8%	29.6%	17.2%	27.4%	24.8%		
MAIN	Installed Capability	42,082	44,132	44,589	46,319	46,215	-0.2	2.4%
	Peak Load	24,303	28,159	27,805	29,060	28,036	-3.5	3.6%
	Installed Margin	17,779	15,973	16,784	17,259	18,179		
	Capacity Margin	42.2%	36.2%	37.6%	37.3%	39.3%		
SPP	Installed Capability	56,960	59,571	60,971	63,956	64,812	1.3	3.3%
	Peak Load	32,743	35,799	35,112	34,618	33,877	-2.1	0.9%
	Installed Margin	24,217	23,772	25,859	29,338	30,935		
	Capacity Margin	42.5%	39.9%	42.4%	45.9%	47.7%		
ERCOT	Installed Capability	43,451	43,943	44,163	44,036	44,880	1.9	0.8%
	Peak Load	25,347	29,684	31,937	29,776	28,730	-3.5	3.2%
	Installed Margin	18,104	14,259	12,226	14,260	16,150		
	Capacity Margin	41.7%	32.4%	27.7%	32.4%	36.0%		
MAPP	Installed Capability	28,652	29,088	28,927	29,434	29,266	-0.6	0.5%
	Peak Load	17,816	18,807	18,989	18,803	18,850	0.2	1.4%
	Installed Margin	10,836	10,281	9,938	10,631	10,416		
	Capacity Margin	37.8%	35.3%	34.4%	36.1%	35.6%		
WSCC	Installed Capability	109,682	112,835	117,344	119,527	126,006	5.4	3.5%
	Peak Load	68,601	77,065	77,640	77,997	76,171	-2.3	2.7%
	Installed Margin	41,081	35,770	39,704	41,530	49,835		
	Capacity Margin	37.5%	31.7%	33.8%	34.7%	39.5%		
TOTAL UNITED STATES**	Installed Capability	598,066	612,453	622,125	636,475	646,721	1.6	2.0%
	Peak Load	373,985	410,779	436,374	423,660	422,857	-0.2	3.1%
	Installed Margin	224,081	201,674	185,751	212,815	223,864		
	Capacity Margin	37.5%	32.9%	29.9%	33.4%	34.6%		

* Compound annual growth rate from 1982/83 to 1986/87.

** U.S. totals are meaningless and should not be used for policy purposes.

NOTE: For definitions of terms see page 5.

RELATIONSHIP BETWEEN SUMMER AND WINTER PEAK LOADS 1974-1986

The relationship between the summer and winter peak loads in the different regions of the country, and also for the contiguous United States, are shown in the accompanying table, where the summer peak load in each case is expressed as a percentage of the winter peak load for the following season.

In those regions where the summer peak load has been characteristically higher than the peak during the following winter, the percentage figure has, expectedly, been above 100 percent. This has been true particularly in SPP and ERCOT, where, due to climatic conditions, heavy air conditioning loads during the summer months have caused peaks that far exceed those during the following winter.

From the mid-1960s to the mid-1970s summer peaks for the country as a

whole generally exceeded the peaks for the following winter by increasing amounts. In 1970, and again in 1971, apparently normal summer peaks were whole generally exceeded the peaks for the following winter by increasing amounts. In 1970, and again in 1971, apparently normal summer peaks were followed by winter peaks depressed both by mild weather and reduced industrial loads. This combination produced summer to winter peak relationships of 111 percent and 112 percent respectively in 1970 and 1971. After falling back to 110 percent in 1972, the summer/winter ratio jumped to an all-time high of 117 percent in 1973 because of the unprecedented drop in the winter peak load from the previous year. The ratio lowered only one point in 1974 since both the summer and winter peak loads were little changed from those experienced in 1973.

Through the rest of the 1970s the ratio fluctuated in the more normal range of between 106 and 108 percent. The hot summer of 1980 and the economic downturn of 1982 helped to produce values of 111 and 110 percent respectively. In 1982 the summer peak dropped 3.1 percent and winter peak dropped 4.5 percent. The greater relative decline in the winter peak caused the summer/winter ratio to increase to 111 in 1982. The national ratio dropped to 109 percent in 1983. Then, due to a rebound in the 1984/85 winter peak load, the ratio fell to 103 percent in 1984--the lowest value registered since 1965. More normal ratios occurred in the nine regions in 1985, with the contiguous U.S. registering a value of 109 percent. In 1986 a slight decline in the national winter peak, coupled with a 3.4 percent increase in the summer peak, caused the summer/winter ratio to increase to 113 percent.

Table 3 - SUMMER PEAK LOADS EXPRESSED AS PERCENTAGE OF PEAK LOAD FOR THE FOLLOWING WINTER

Regions	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87
NPCC	104	102	96	105	102	100	104	101	105	105	102	105	103
MAAC	123	114	108	115	111	114	116	109	120	115	106	117	114
ECAR	105	102	97	101	99	104	101	102	105	103	98	101	107
SERC	109	100	93	99	99	101	99	97	101	106	87	101	102
MAIN	125	119	122	122	118	123	127	121	129	123	127	112	128
SPP	156	124	144	144	138	133	147	139	132	128	130	130	140
ERCOT	157	141	142	142	134	130	132	128	131	118	115	128	136
MAPP	119	106	103	103	111	105	111	108	109	111	109	106	113
WSCC	107	104	107	107	98	100	107	105	105	98	103	107	108
U.S. TOTAL	116	108	106	106	107	108	111	108	111	109	103	109	113

ANNUAL ENERGY REQUIREMENTS AND ANNUAL LOAD FACTORS 1982-1986

The 1986 energy requirements and annual load factors by reliability council are given in Tables 4 and 5, together with corresponding information for the previous four years. Table 4 shows that during 1986 electric energy requirements for the

contiguous United States amounted to 2.5 billion megawatthours--1.3 percent higher than the output for 1985. The point-to-point average annual compound increase between 1982 and 1986 for energy requirements was 2.9 percent.

As can be seen from Table 5, the 1986 annual load factor for the sum of the nine regions was 60.7 percent. This kept the value in the usual low 60 percent range for another year, after the lower than normal national load factors experienced in 1983 and 1984.

Table 4 - ANNUAL ENERGY REQUIREMENTS (Megawatthours in Thousands)

Regions	1982	1983	1984	1985	1986	86/85 % Inc	Growth Rate 1982-1986*
NPCC	201,377	210,815	217,455	220,782	227,865	3.2%	3.1%
MAAC	171,662	179,990	186,034	189,671	197,056	3.9%	3.5%
ECAR	347,091	364,501	383,029	387,514	390,245	0.7%	3.0%
SERC	466,832	490,899	502,915	522,648	545,409	4.4%	4.0%
MAIN	158,116	165,974	170,930	173,589	177,190	2.1%	2.9%
SPP	211,595	217,688	225,642	229,677	216,501	-5.7%	0.6%
ERCOT	169,769	173,372	185,283	190,758	190,796	0.0%	3.0%
MAPP	96,992	102,526	105,378	105,797	106,824	1.0%	2.4%
WSCC	435,310	435,868	468,937	478,790	480,218	0.3%	2.5%
TOTAL U.S.	2,258,744	2,341,633	2,445,603	2,499,226	2,532,104	1.3%	2.9%

* Average annual growth rate from 1982 to 1986.

Table 5 - ANNUAL PERCENT LOAD FACTOR

Regions	1982	1983	1984	1985	1986
NPCC	63.1	64.0	64.9	63.0	66.7
MAAC	57.9	59.1	59.8	58.4	59.9
ECAR	66.4	63.1	64.7	66.7	64.3
SERC	61.8	57.6	53.6	60.5	59.7
MAIN	57.5	54.6	55.3	61.1	56.2
SPP	56.1	54.2	56.4	58.2	52.0
ERCOT	58.3	56.6	57.2	57.2	55.6
MAPP	56.9	56.3	58.0	60.6	57.4
WSCC	68.7	64.6	66.7	65.8	66.6
TOTAL U.S.	62.0	59.5	59.7	62.0	60.7

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TABLE 6
CHANGES IN SCHEDULED OPERATION DATE OF NUCLEAR AND FOSSIL-FIRED STEAM TURBINE-GENERATORS
REMOVED FROM SCHEDULE AND DELAYED A YEAR OR MORE
BETWEEN JANUARY 1, 1986 AND JANUARY 1, 1987

Owner	Plant Name and Unit Number	T Y P E	Nameplate Capacity MW	Net Expected Capability MW	Scheduled Operation Date	
					as of January 1, 1986	as of January 1, 1987
Total Nuclear Units Removed from Schedule		none				
Public Service Co. of New Hampshire	Seabrook No. 1	N	1,197	1,150	11-86	11-87
Tennessee Valley Authority	Bellefonte No. 1	N	1,218	1,177	1-94	-99
Tennessee Valley Authority	Bellefonte No. 2	N	1,218	1,177	1-96	-99
Tennessee Valley Authority	Watts Bar No. 1	N	1,218	1,177	9-86	-99
Tennessee Valley Authority	Watts Bar No. 2	N	1,218	1,177	4-88	-99
Texas Utilities Company System	Comanche Peak No. 1	N	1,161	1,150	7-87	7-89
Texas Utilities Company System	Comanche Peak No. 2	N	1,161	1,150	1-88	1-90
Seven Nuclear Units Delayed One Year or More			8,391	8,158		
Seven Nuclear Units Removed from Schedule and/or Delayed			8,391	8,158		
General Public Utilities	Coal No. 1	F	636	300	5-95	Removed
Kentucky Utilities	Hancock No. 1	F	720	650	10-93	Removed
Lower Colorado River Authority	Fayette No. 4	F	418	400	7-92	Removed
Three Fossil Units Removed from Schedule			1,774	1,350		
Central Power & Light Company	Coleto Creek No. 2	F	657	600	12-94	12-96
Houston Lighting & Power Company	Malakoff No. 1	F	643	645	12-91	12-96
Houston Lighting & Power Company	Malakoff No. 2	F	643	645	12-93	12-98
Louisville Gas & Electric Company	Trimble County No. 1	F	507	495	7-88	7-91
Pacific Gas & Electric Company	Geysers No. 21	F	168	140	12-88	12-89
South Carolina Public Service Authority	Cross No. 1	F	510	500	5-93	-99
Texas Utility Company System	Forest Grove No. 1	F	727	750	2-93	2-94
Texas Utility Company System	Twin Oak No. 2	F	735	750	1-92	1-93
Eight Fossil Units Delayed One Year or More			4,590	4,525		
Eleven Fossil Units Removed from Schedule and/or Delayed			6,364	5,875		
TOTAL NUCLEAR AND FOSSIL UNITS REMOVED FROM SCHEDULE AND DELAYED			(18)	14,755	14,033	

ADDITIONS TO ELECTRIC GENERATING CAPABILITY DURING 1986

The 1986 additions to electric generating capability in the contiguous United States are shown in the top part of Table 7 according

to the type of generating units. The second portion of the table presents the same information arranged according to the reliability

councils in which the new capability was installed. The third portion of the table reports the same information classified according to ownership of the new units.

Table 7 - 1986 ADDITIONS TO ELECTRIC GENERATING CAPABILITY (In Terms of Net Expected Capabilities of the Units)

	T H E R M A L								H Y D R A U L I C					
	Steam Turbine-Generators				Combustion		Diesel		Conventional		Pumped-Storage		Total	
	Nuclear		Conventional		Turbine-Generators		Engine-Generators							
	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW
1986 ADDITIONS	8	8,949	13	6,059	3	75	3	21	4	250	-	-	31	15,354
ADDITIONS BY REGION														
NPCC	1	1,150	-	-	-	-	-	-	-	-	-	-	1	1,150
MAAC	2	2,069	-	-	-	-	-	-	2	50	-	-	4	2,119
ECAR	-	-	4	1,139	-	-	1	7	-	-	-	-	5	1,146
SERC	1	1,145	-	-	-	-	-	-	-	-	-	-	1	1,145
MAIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPP	1	940	2	1,130	-	-	2	14	-	-	-	-	5	2,084
ERCOT	-	-	2	1,385	-	-	-	-	-	-	-	-	2	1,385
MAPP	-	-	1	450	-	-	-	-	-	-	-	-	1	450
WSCC	3	3,645	4	1,955	3	75	-	-	2	200	-	-	12	5,875
ADDITIONS BY OWNERSHIP														
Investor-Owned	8	8,949	7	3,834	-	-	-	-	2	50	-	-	17	12,833
Federal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Municipal	-	-	2	830	1	25	3	21	2	200	-	-	8	1,076
Cooperative	-	-	2	850	-	-	-	-	-	-	-	-	2	850
State and Local	-	-	2	545	2	50	-	-	-	-	-	-	4	595

TABLE 8 - 1986 ADDITIONS TO ELECTRIC GENERATING CAPABILITY
U.S. Electric Utility Systems
Units 4,000 kW and Larger

LEGEND FOR LISTING OF PROJECTS PLACED IN SERVICE

SYMBOLS:

Investor-Owned.....I
Federal.....F
Municipal.....M
Cooperative.....C
State & Local.....SL
Thermal
 Conventional steam turbine-
 generator.....T
 Nuclear steam turbine-generator...N
 Combustion turbine-generator.....G
 Diesel engine-generator.....D

Hydraulic

 Hydraulic turbine-generator.....H
 Pumped-Storage
 Pumped-storage turbine-
 generator.....S
 Reversible pumped-storage
 turbine-generator.....R
 Combined-Cycle
 Combustion turbine-generator
 for combined-cycle
 operation.....GC
 Conventional steam turbine-
 generator for combined-cycle
 operation.....TC

+ Denotes multiple ownership of the unit. In such cases, the name of the participating power system in whose service area the installation will be located is shown. In case the location does not fall within the service area of any of the participants, the name of the power system shown is the first in alphabetical order among the major participants.

NOTE: Megawatts shown for individual generating units represent, in most cases, the net operating capability expected by the utility systems; in other cases they represent the manufacturer's nameplate rating of the unit..

TABLE B

REGION	SYSTEM	UNIT	OWNER-SHIP	TYPE	FOSSIL FUELS	MW of NET EXPECTED CAPABILITY
NPCC	+NORTHEAST UTILITIES	MILLSTONE POINT NO 3	I	N		1,150
MAAC	PHILADELPHIA ELECTRIC CO	LIMERICK NO 1	I	N		1,055
MAAC	+PUBLIC SERVICE ELECTRIC & GAS CO	HOPE CREEK NO 1	I	N		1,014
MAAC	SAFE HARBOR WATER POWER CORP	SAFE HARBOR NO 9	I	H		25
MAAC	SAFE HARBOR WATER POWER CORP	SAFE HARBOR NO 11	I	H		25
ECAR	BAY CITY MICHIGAN	MUNT PWR PLANT	M	D		7
ECAR	INDIANAPOLIS POWER & LIGHT CO	PETERSBURG NO 4	I	T	Coal	515
ECAR	NORTHERN INDIANA PUBLIC SERVICE CO	SCHAEFER NO 18	I	T	Coal	344
ECAR	SOUTHERN INDIANA GAS & ELECTRIC CO	BROWN NO 2	I	T	Coal	250
ECAR	WYANDOTTE MICHIGAN	WYANDOTTE NO 7	M	T	Coal	30
SERC	DUKE POWER CO	CATAWBA NO 2	I	N		1,145
SPP	CHANUTE KANSAS	DIESEL B	M	D		7
SPP	CHANUTE KANSAS	DIESEL C	M	D		7
SPP	GRAND RIVER DAM AUTHORITY	GRDA ONE UNIT 2	SL	T	Coal	490
SPP	+GULF STATES UTILITIES CO	RIVER BEND NO 1	I	N		940
SPP	+SOUTHWESTERN ELECTRIC POWER CO	DOLET HILLS NO 1	I	T	Coal	640
ERCOT	HOUSTON LIGHTING & POWER CO	LIMESTONE NO 2	I	T	Coal	720
ERCOT	+WEST TEXAS UTILITIES CO	OKLAUNION NO 1	I	T	Coal	665
MAPP	+BASIN ELECTRIC POWER COOP	ANTELOPE VALLEY NO 2	C	T	Coal	450
WSCC	+ARIZONA PUBLIC SERVICE CO	PALO VERDE NO 1	I	N		1,270
WSCC	+ARIZONA PUBLIC SERVICE CO	PALO VERDE NO 2	I	N		1,270
WSCC	DESERET G & T COOP	BONANZA NO 1	C	T	Coal	400
WSCC	+LOS ANGELES CALIFORNIA	INTERMOUNTAIN NO 1	M	T	Coal	800
WSCC	METROPOLITAN WATER DISTRICT	RED MOUNTAIN NO 1	M	H		4
WSCC	+MONTANA POWER CO	COLSTRIP NO 4	I	T	Coal	700
WSCC	NORTHERN CALIFORNIA POWER AGENCY	GEO PLANT 2 UNIT 4	SL	T	Geothermal	55
WSCC	PACIFIC GAS & ELECTRIC CO	DIABLO CANYON NO 2	I	N		1,105
WSCC	SANTA CLARA CALIFORNIA	COMBUSTION TURBINE NO 1	M	G		25
WSCC	SEATTLE WASHINGTON	BOUNDARY NO 56	M	H		196
WSCC	TURLOCK IRRIGATION DISTRICT	GT PROJECT NO 1	SL	G		25
WSCC	TURLOCK IRRIGATION DISTRICT	GT PROJECT NO 2	SL	G		25

31 GENERATING UNITS WERE ADDED WITH TOTAL NET EXPECTED CAPABILITY OF

15,354 MW

NUCLEAR ELECTRIC POWER GENERATING UNITS IN COMMERCIAL OPERATION

No steam turbine-generators for nuclear projects have been ordered since 1976, and no nuclear steam supply systems (reactors) since 1978. As of January 1, 1987, nuclear capacity accounts for 55 percent of

the aggregate of the industry's scheduled expansion program.

Table 9 shows subtotals of the amount of nuclear megawatts placed in service each year. As of January 1, 1987, there were 99 nuclear units in

commercial operation with an aggregate winter rating of 83.9 thousand megawatts. There were eight additions to nuclear generating capacity during 1986.

Table 9 - NUCLEAR POWER UNITS IN OPERATION IN THE CONTIGUOUS U.S. as of January 1, 1987

SYSTEM	UNIT NAME & NO.	YEAR PLACED IN COMMERCIAL OPERATION	C A P A B I L I T Y		YEARLY SUBTOTALS OF SUMMER MW RATINGS
			SUMMER MW	WINTER MW	
1. Commonwealth Edison Company	Dresden No. 1	1960	197	207	197
2. Yankee Atomic Electric Company	Yankee No. 1	1961	175	176	175
3. Consumers Power Company	Big Rock Point	1962	63	63	63
4. Washington Public Power Supply System	Hanford	1965	840	840	840
5. Connecticut Yankee Atomic Power Co.	Haddam No. 1	1968	555	580	
6. SoCal Edison & San Diego G & E	San Onofre No. 1	1968	436	436	991
7. GPU Nuclear Corporation	Oyster Creek No. 1	1969	620	650	
8. Niagara Mohawk Power Corp.	Nine Mile Point No. 1	1969	610	610	
9. Rochester Gas & Electric Corp.	Ginna No. 1	1969	470	470	1,700
10. Northeast Utilities	Millstone Point No. 1	1970	654	660	
11. Wisconsin Electric Power Company	Point Beach No. 1	1970	495	495	1,149
12. Carolina Power & Light Company	Robinson No. 2	1971	665	700	
13. Dairyland Power Cooperative	La Crosse	1971	46	46	
14. Northern States Power Company	Monticello No. 1	1971	536	557	
15. Commonwealth Edison Company	Dresden No. 2	1971	772	794	2,019
16. Boston Edison Company	Pilgrim No. 1	1972	670	670	
17. Commonwealth Edison Company	Quad Cities No. 1	1972	768	789	
18. Commonwealth Edison Company	Quad Cities No. 2	1972	769	789	
19. Florida Power & Light Company	Turkey Point No. 3	1972	666	696	
20. Maine Yankee Atomic Power Company	Wiscasset	1972	814	830	
21. Vermont Yankee Nuclear Power Corp.	Vernon	1972	496	528	
22. Virginia Electric & Power Company	Surry No. 1	1972	775	775	4,958
23. Commonwealth Edison Company	Dresden No. 3	1973	773	794	
24. Consumers Power Company	Palisades No. 1	1973	635	740	

Table 9 - NUCLEAR POWER UNITS IN OPERATION IN THE CONTIGUOUS U.S. as of January 1, 1987 -- Cont'd.

SYSTEM	UNIT NAME & NO.	YEAR PLACED IN COMMERCIAL OPERATION	C A P A B I L I T Y		YEARLY SUBTOTALS OF SUMMER MW RATINGS
			SUMMER MW	WINTER MW	
25. Duke Power Company	Oconee No. 1	1973	860	860	
26. Duke Power Company	Oconee No. 2	1973	860	860	
27. Florida Power & Light Company	Turkey Point No. 4	1973	666	696	
28. Northern States Power Company	Prairie Island No. 1	1973	503	523	
29. Omaha Public Power District	Fort Calhoun No. 1	1973	439	457	
30. Tennessee Valley Authority	Browns Ferry No. 1	1973	1,067	1,067	
31. Virginia Electric & Power Company	Surry No. 2	1973	775	775	
32. Wisconsin Electric Power Company	Point Beach No. 2	1973	495	495	7,073
33. Arkansas Power & Light Company	Arkansas Nuclear No. 1	1974	836	836	
34. Commonwealth Edison Company	Zion No. 1	1974	1,040	1,040	
35. Commonwealth Edison Company	Zion No. 2	1974	1,040	1,040	
36. Consolidated Edison Co. of NY	Indian Point No. 2	1974	849	864	
37. Duke Power Company	Oconee No. 3	1974	860	860	
38. Iowa Electric Light & Power Company	Arnold No. 1	1974	480	510	
39. GPU Nuclear Corporation	Three Mile Island No. 1	1974	776	800	
40. Nebraska Public Power District	Cooper Nuclear No. 1	1974	778	778	
41. Northern States Power Company	Prairie Island No. 2	1974	500	520	
42. Philadelphia Electric Company	Peach Bottom No. 2	1974	1,051	1,055	
43. Philadelphia Electric Company	Peach Bottom No. 3	1974	1,035	1,035	
44. Wisconsin Public Service Corp.	Kewaunee No. 1	1974	525	517	9,770
45. Baltimore Gas & Electric Co.	Calvert Cliffs No. 1	1975	810	820	
46. Carolina Power & Light Company	Brunswick No. 2	1975	790	790	
47. Georgia Power Company	Hatch No. 1	1975	771	771	
48. Indiana & Michigan Electric Company	Cook No. 1	1975	1,050	1,050	
49. New York Power Authority	Fitzpatrick No. 1	1975	821	821	
50. Sacramento Utility District	Rancho Seco No. 1	1975	875	903	
51. Tennessee Valley Authority	Browns Ferry No. 2	1975	1,067	1,067	6,184
52. Duquesne Light Company	Beaver Valley No. 1	1976	800	800	
53. Florida Power & Light Company	St. Lucie No. 1	1976	777	795	
54. Northeast Utilities	Millstone Point No. 2	1976	864	864	
55. Portland General Electric Company	Trojan	1976	1,080	1,080	
56. New York Power Authority	Indian Point No. 3	1976	965	965	4,486
57. Alabama Power Company	Farley No. 1	1977	807	807	
58. Baltimore Gas & Electric Company	Calvert Cliffs No. 2	1977	825	860	
59. Carolina Power & Light Company	Brunswick No. 1	1977	790	790	
60. Florida Power Corporation	Crystal River No. 3	1977	782	807	
61. Public Service Electric & Gas Co.	Salem Nuclear No. 1	1977	1,079	1,100	
62. Tennessee Valley Authority	Browns Ferry No. 3	1977	1,067	1,067	
63. Toledo Edison Company	Davis-Besse No. 1	1977	906	906	6,256
64. Indiana & Michigan Electric Company	Cook No. 2	1978	1,100	1,100	
65. Virginia Electric & Power Company	North Anna No. 1	1978	998	907	1,998

Table 9 - NUCLEAR POWER UNITS IN OPERATION IN THE CONTIGUOUS U.S. as of January 1, 1987 -- Cont'd.

SYSTEM	UNIT NAME & NO.	YEAR PLACED IN COMMERCIAL OPERATION	C A P A B I L I T Y		YEARLY SUBTOTALS OF SUMMER MW RATINGS
			SUMMER MW	WINTER MW	
66. Georgia Power Company	Hatch No. 2	1979	771	771	971
67. Public Service Company of Colorado	Fort St. Vrain No. 1	1979	200	200	
68. Arkansas Power & Light Company	Arkansas Nuclear No. 2	1980	858	858	1,728
69. Virginia Electric & Power Company	North Anna No. 2	1980	870	870	
70. Alabama Power Company	Farley No. 2	1981	812	812	4,226
71. Duke Power Company	McGuire No. 1	1981	1,180	1,180	
72. Public Service Electric & Gas Co.	Salem Nuclear No. 2	1981	1,106	1,120	
73. Tennessee Valley Authority	Sequoyah No. 1	1981	1,128	1,128	
74. Tennessee Valley Authority	Sequoyah No. 2	1982	1,148	1,148	1,148
75. Florida Power & Light Company	St. Lucie No. 2	1983	802	802	2,922
76. Pennsylvania Power & Light Company	Susquehanna No. 1	1983	1,050	1,050	
77. SoCal Edison & San Diego G & E	San Onofre No. 2	1983	1,070	1,070	
78. Commonwealth Edison Company	LaSalle County No. 1	1984	1,048	1,078	7,420
79. Commonwealth Edison Company	LaSalle County No. 2	1984	1,048	1,078	
80. Duke Power Company	McGuire No. 2	1984	1,150	1,150	
81. South Carolina Electric & Gas Company	Summer No. 1	1984	885	885	
82. SoCal Edison & San Diego G & E Co.	San Onofre No. 3	1984	1,080	1,080	
83. Union Electric Company	Callaway No. 1	1984	1,109	1,123	
84. Washington Public Power Supply System	WNP No. 2	1984	1,100	1,100	
85. Commonwealth Edison Company	Byron No. 1	1985	1,120	1,120	
86. Duke Power Company	Catawba No. 1	1985	1,145	1,145	
87. Kansas Gas & Electric Company	Wolf Creek No. 1	1985	1,150	1,150	
88. Louisiana Power & Light Company	Waterford No. 3	1985	1,104	1,104	7,892
89. Mississippi Power & Light Company	Grand Gulf No. 1	1985	1,250	1,250	
90. Pacific Gas & Electric Company	Diablo Canyon No. 1	1985	1,073	1,073	
91. Pennsylvania Power & Light Company	Susquehanna No. 2	1985	1,050	1,050	
92. Arizona Public Service Company	Palo Verde No. 1	1986	1,270	1,270	8,938
93. Arizona Public Service Company	Palo Verde No. 2	1986	1,270	1,270	
94. Duke Power Company	Catawba No. 2	1986	1,145	1,145	
95. Gulf States Utilities Company	River Bend No. 1	1986	937	937	
96. Northeast Utilities	Millstone Point No. 3	1986	1,142	1,150	
97. Pacific Gas & Electric Company	Diablo Canyon No. 2	1986	1,105	1,105	
98. Philadelphia Electric Company	Limerick No. 1	1986	1,055	1,065	
99. Public Service Electric & Gas Company	Hope Creek No. 1	1986	1,014	1,014	
99 Nuclear units totaling			83,104 SUMMER MW	83,904 WINTER MW	

PART II. ELECTRIC POWER SUPPLY 1987-1996

SUMMER CAPABILITIES, PEAK LOADS, AND PERCENT CAPACITY MARGINS

Summer peak capabilities, peak loads, and percent capacity margins as now forecast for the years 1987 through 1996 are shown in Table 10, page 19. Similar information for winter is shown in Table 11, page 21.

SUMMER CAPABILITIES

Preliminary figures published in the 1986 POST-SUMMER ELECTRIC POWER SURVEY indicated that the 1986 capability at time of summer peak was 0.9 percent above 1985. According to final data now available, the actual increase was 1.9 percent.

The majority of summer capability values shown in this report are below the projections for the same years 12 months ago. For the nine regions taken together, reductions range from 1.6 in 1987 to 0.1 percent in 1994, with 1991 and 1992 each showing increases of 0.2 percent.

The 1996 summer capability for the sum of the nine regions is projected at 716.0 thousand megawatts. This represents an average annual increase of 1.1 percent between the first and tenth forecast years.

SUMMER PEAK LOADS

Summer peak load forecasts have been reduced by six of the nine reliability councils. MAAC, SERC and MAIN increased their projections throughout the period. For the nine regions taken together, peak loads range from 0.4 percent lower for 1987 to 1.7 percent lower in both 1994 and 1995, compared with values shown for those years in the 1985 ELECTRIC POWER ANNUAL REPORT. The summer peak load for the sum of the nine regions, which was 476.3 thousand megawatts in 1986, is projected to be 484.5 thousand megawatts in 1987, an increase of 1.7 percent. For the summer of 1996, the projection is 577.1 thousand megawatts. This represents an average annual increase of 2.0 percent between the first and tenth forecast years.

SUMMER PERCENT CAPACITY MARGINS

Of the 81 summer capacity margin percentages shown for the nine-year period 1987-1995 for the nine reliability councils, 23 of the values are lower than the equivalent respective values one year previous, 57 of the percent margins are higher, and one is unchanged. Only MAIN shows consistently lower percent margins throughout the whole period. SERC is the only other region with more decreases than increases. SPP, MAPP and WSCC show increases throughout while the other regions show a preponderance of increases in percent capacity margins. Summer percent capacity margins for the country as a whole are lower for 1987 and 1988, and higher for the remainder of the period. As now forecast, the summer capacity margins for the country range from 25.4 percent in 1988 to 19.4 percent in 1996, shown in these reports for the first time.

Table 10 - SUMMER CAPABILITIES, PEAK LOADS, INSTALLED MARGINS & PERCENT CAPACITY MARGINS -- 1987-1996 PROJECTED (Megawatts)

Regions		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Growth Rate 1987-1996*
NPCC	Capability	53,966	57,620	57,698	58,086	59,585	59,271	58,893	58,940	59,217	60,104	1.2%
	Peak Load	41,367	41,931	42,419	42,956	43,648	44,481	45,148	45,847	46,592	47,447	1.5%
	Installed Margin	12,599	15,689	15,279	15,130	15,937	14,790	13,745	13,093	12,625	12,657	
	Capacity Margin	23.3%	27.2%	26.5%	26.0%	26.7%	25.0%	23.3%	22.2%	21.3%	21.1%	
MAAC	Capability	50,052	50,461	51,134	51,913	52,327	52,890	52,840	52,947	53,107	53,561	0.8%
	Peak Load	38,000	38,544	39,043	39,481	39,925	40,398	40,869	41,336	41,826	42,355	1.2%
	Installed Margin	12,052	11,917	12,091	12,432	12,402	12,492	11,971	11,611	11,281	11,206	
	Capacity Margin	24.1%	23.6%	23.6%	23.9%	23.7%	23.6%	22.7%	21.9%	21.2%	20.9%	
ECAR	Capability	93,487	95,502	97,087	98,092	101,249	101,534	102,812	103,098	103,356	103,802	1.2%
	Peak Load	70,056	71,603	73,265	74,340	75,479	76,662	77,926	79,250	80,698	82,081	1.8%
	Installed Margin	23,431	23,899	23,822	23,752	25,770	24,872	24,886	23,848	22,658	21,721	
	Capacity Margin	25.1%	25.0%	24.5%	24.2%	25.5%	24.5%	24.2%	23.1%	21.9%	20.9%	
SERC	Capability	136,809	137,802	142,896	144,960	146,660	149,311	150,249	153,019	155,414	157,313	1.6%
	Peak Load	105,770	108,212	111,390	113,892	116,839	119,116	121,337	123,775	126,458	129,054	2.2%
	Installed Margin	31,039	29,590	31,506	31,068	29,821	30,195	28,912	29,244	28,956	28,259	
	Capacity Margin	22.7%	21.5%	22.0%	21.4%	20.3%	20.2%	19.2%	19.1%	18.6%	18.0%	
MAIN	Capability	48,053	47,916	49,138	49,126	49,308	49,438	49,874	49,891	49,959	49,832	0.4%
	Peak Load	36,380	36,948	37,524	38,109	38,726	39,377	40,010	40,631	41,245	41,883	1.6%
	Installed Margin	11,673	10,968	11,614	11,017	10,582	10,061	9,864	9,260	8,714	7,949	
	Capacity Margin	24.3%	22.9%	23.6%	22.4%	21.5%	20.4%	19.8%	18.6%	17.4%	16.0%	
SPP	Capability	64,789	64,695	64,723	64,665	64,822	64,716	65,165	65,415	65,252	65,929	0.2%
	Peak Load	46,246	46,876	47,612	48,562	49,659	50,848	51,946	53,127	54,416	55,442	2.0%
	Installed Margin	18,543	17,819	17,111	16,103	15,163	13,868	13,219	12,288	10,836	10,487	
	Capacity Margin	28.6%	27.5%	26.4%	24.9%	23.4%	21.4%	20.3%	18.8%	16.6%	15.9%	
ERCOT	Capability	47,398	50,317	52,419	53,832	54,812	55,885	56,785	58,220	58,381	59,390	2.5%
	Peak Load	39,072	39,755	40,904	42,146	43,444	44,776	46,211	47,591	49,029	50,329	2.9%
	Installed Margin	8,326	10,562	11,515	11,686	11,368	11,109	10,574	10,629	9,352	9,061	
	Capacity Margin	17.6%	21.0%	22.0%	21.7%	20.7%	19.9%	18.6%	18.3%	16.0%	15.3%	
MAPP	Capability	29,119	29,981	29,850	29,944	30,102	30,146	30,577	30,566	30,565	30,890	0.7%
	Peak Load	21,645	22,079	22,320	22,687	22,981	23,354	23,782	24,181	24,566	24,949	1.6%
	Installed Margin	7,474	7,902	7,530	7,257	7,121	6,792	6,795	6,385	5,999	6,041	
	Capacity Margin	25.7%	26.4%	25.2%	24.2%	23.7%	22.5%	22.2%	20.9%	19.6%	19.5%	
WSCC	Capability	123,755	127,551	129,284	130,868	131,089	131,127	131,815	133,071	134,376	135,035	1.0%
	Peak Load	85,932	87,608	90,011	91,764	93,690	95,645	97,532	99,604	101,715	103,604	2.1%
	Installed Margin	37,823	39,943	39,273	39,104	37,399	35,482	34,283	33,467	32,661	31,431	
	Capacity Margin	30.6%	31.3%	30.4%	29.9%	28.5%	27.1%	26.0%	25.1%	24.3%	23.3%	
TOTAL UNITED STATES**	Capability	647,428	661,845	674,229	681,486	689,954	694,318	699,010	705,167	709,627	715,956	1.1%
	Peak Load	484,468	493,556	504,488	513,937	524,391	534,657	544,761	555,342	566,545	577,144	2.0%
	Installed Margin	162,960	168,289	169,741	167,549	165,563	159,661	154,249	149,825	143,082	138,812	
	Capacity Margin	25.2%	25.4%	25.2%	24.6%	24.0%	23.0%	22.1%	21.2%	20.2%	19.4%	

* Compound annual growth rate from 1987 to 1996.

** U.S. totals are meaningless and should not be used for policy purposes.

NOTE: For definitions of terms see page 5.

Capability equals NERC's "Planned Resources" series.

WINTER CAPABILITIES, PEAK LOADS, AND PERCENT CAPACITY MARGINS

WINTER CAPABILITIES

Winter 1987/88 capability now projected for the entire electric utility industry is 667.7 thousand megawatts. The regional winter capability values shown in this report for 1987/88 through 1995/96 differ only slightly from the projections for the same years 12 months ago. MAAC is the only reliability council that has increased its winter capability projections over the whole period. For the nine regions taken together, changes range from an increase of 0.4 percent in 1990 to a reduction of 0.8 percent in 1987.

For winter 1996/97 the total capability of the industry is projected to reach 727.2 thousand megawatts. This value yields an average annual compound growth rate of 1.0 percent between the first and tenth forecast years.

The scheduled additions table on page 25 summarizes the number and aggregate ratings of planned generating units that have so far been both ordered from the equipment manufacturers and been placed in the expansion program by having been assigned official scheduled dates of commercial operation. As of January 1, 1987, the furthest out year for which an ordered unit had been scheduled for operation was 2005.

WINTER PEAK LOADS

As now projected, the winter 1987/88 peak load for the contiguous U.S. is expected to be 444.0 thousand megawatts, an increase of 5.0 percent over the winter 1986/87 peak load. With the exception of MAAC and SERC, the new regional projections for 1987/88 through 1995/96 generally show reduced values. The total of the nine regions shows reductions

ranging from 0.3 percent to 1.9 percent below the winter peak loads expected for these years twelve months ago.

For winter 1996/97, the furthest out year projected in this report, the expected peak load is 534.2 thousand megawatts. This represents an average annual increase of 2.1 percent between the first and tenth forecast years.

WINTER PERCENT CAPACITY MARGINS

Compared with projected percent capacity margin values calculated on the same basis one year ago, regional winter percent margins reported in this survey are generally higher for all reliability councils except SERC. For the country as a whole, percent capacity margins are now projected to range from 33.5 percent for the winter of 1987/88 to 26.6 percent for 1996/97.

Table 11 - WINTER CAPABILITIES, PEAK LOADS, INSTALLED MARGINS & PERCENT CAPACITY MARGIN

Regions		1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	Growth Rate 1987-1996*
NPCC	Capability	58,156	58,440	58,580	60,458	60,089	59,955	59,764	59,674	59,746	60,942	0.5%
	Peak Load	40,129	40,522	40,946	41,285	41,872	42,491	43,042	43,587	44,201	44,942	1.3%
	Installed Margin	18,027	17,918	17,634	19,173	18,217	17,464	16,722	16,087	15,545	16,000	
	Capacity Margin	31.0%	30.7%	30.1%	31.7%	30.3%	29.1%	28.0%	27.0%	26.0%	26.3%	
MAAC	Capability	52,757	53,035	53,672	54,557	54,527	55,068	55,259	55,351	55,511	56,050	0.7%
	Peak Load	34,017	34,802	35,449	36,153	36,822	37,524	38,243	38,899	39,568	40,226	1.9%
	Installed Margin	18,740	18,233	18,223	18,404	17,705	17,544	17,036	16,452	15,943	15,824	
	Capacity Margin	35.5%	34.4%	34.0%	33.7%	32.5%	31.9%	30.8%	29.7%	28.7%	28.2%	
ECAR	Capability	96,940	98,568	98,741	100,757	102,915	103,996	104,248	104,619	105,137	105,437	0.9%
	Peak Load	68,721	70,160	71,368	72,520	73,679	74,905	76,216	77,656	79,085	80,447	1.8%
	Installed Margin	28,219	28,408	27,373	28,237	29,236	29,091	28,032	26,963	26,052	24,990	
	Capacity Margin	29.1%	28.8%	27.7%	28.0%	28.4%	28.0%	26.9%	25.8%	24.8%	23.7%	
SERC	Capability	139,547	141,955	145,051	147,293	148,958	151,166	153,812	155,532	159,029	160,036	1.5%
	Peak Load	104,299	107,289	109,687	112,048	114,501	116,594	119,268	121,988	124,394	127,054	2.2%
	Installed Margin	35,248	34,666	35,364	35,245	34,457	34,572	34,544	33,544	34,635	32,982	
	Capacity Margin	25.3%	24.4%	24.4%	23.9%	23.1%	22.9%	22.5%	21.6%	21.8%	20.6%	
MAIN	Capability	49,023	49,878	50,002	50,040	50,219	50,481	50,781	50,858	50,709	50,553	0.3%
	Peak Load	29,469	30,080	30,640	31,231	31,869	32,455	33,068	33,656	34,255	34,878	1.9%
	Installed Margin	19,554	19,798	19,362	18,809	18,350	18,026	17,713	17,202	16,454	15,675	
	Capacity Margin	39.9%	39.7%	38.7%	37.6%	36.5%	35.7%	34.9%	33.8%	32.4%	31.0%	
SPP	Capability	65,141	65,082	65,136	64,561	64,990	65,132	64,998	65,166	65,814	66,408	0.2%
	Peak Load	34,433	34,712	35,474	36,280	37,245	38,066	38,989	39,888	40,660	41,515	2.1%
	Installed Margin	30,708	30,370	29,662	28,281	27,745	27,066	26,009	25,278	25,154	24,893	
	Capacity Margin	47.1%	46.7%	45.5%	43.8%	42.7%	41.6%	40.0%	38.8%	38.2%	37.5%	
ERCOT	Capability	49,567	50,220	53,761	54,705	55,316	56,664	57,401	58,460	59,312	60,994	2.3%
	Peak Load	31,581	32,707	34,029	35,441	36,862	38,435	39,952	41,539	43,142	44,787	4.0%
	Installed Margin	17,986	17,513	19,732	19,264	18,454	18,229	17,449	16,921	16,170	16,207	
	Capacity Margin	36.3%	34.9%	36.7%	35.2%	33.4%	32.2%	30.4%	28.9%	27.3%	26.6%	
MAPP	Capability	29,845	29,924	29,832	30,115	30,205	30,416	31,219	31,206	31,215	31,625	0.6%
	Peak Load	19,310	19,584	19,866	20,175	20,519	20,911	21,266	21,618	21,959	22,323	1.6%
	Installed Margin	10,535	10,340	9,966	9,940	9,686	9,505	9,953	9,588	9,256	9,302	
	Capacity Margin	35.3%	34.6%	33.4%	33.0%	32.1%	31.3%	31.9%	30.7%	29.7%	29.4%	
WSCC	Capability	126,724	128,406	130,936	131,067	131,444	131,968	132,587	134,026	135,154	135,199	0.7%
	Peak Load	82,040	83,904	86,015	87,826	89,523	91,274	93,180	94,901	96,960	97,978	2.0%
	Installed Margin	44,684	44,502	44,921	43,241	41,921	40,694	39,407	39,125	38,194	37,221	
	Capacity Margin	35.3%	34.7%	34.3%	33.0%	31.9%	30.8%	29.7%	29.2%	28.3%	27.5%	
TOTAL UNITED STATES**	Capability	667,700	675,508	685,711	693,553	698,663	704,846	710,069	714,892	721,627	727,244	1.0%
	Peak Load	443,999	453,760	463,474	472,959	482,892	492,655	503,204	513,732	524,224	534,150	2.1%
	Installed Margin	223,701	221,748	222,237	220,594	215,771	212,191	206,865	201,160	197,403	193,094	
	Capacity Margin	33.5%	32.8%	32.4%	31.8%	30.9%	30.1%	29.1%	28.1%	27.4%	26.6%	

* Compound annual growth rate from 1987/88 to 1996/97.

** U.S. totals are meaningless and should not be used for policy purposes.

NOTE: For definitions of terms see page 5.
Capability equals NERC's "Planned Resources" series.

RELATIONSHIP BETWEEN SUMMER AND WINTER PEAK LOADS 1987-1996

The relationship between the summer and winter peak loads in the different regions of the country, and also for the contiguous United States, are shown in the accompanying table, where the summer peak load in each case is expressed as a percentage of the winter peak load for the following season.

Though there are some changes from year to year in the regional ratios, the movements are generally offsetting to the extent that the summer/winter ratio for the sum of the nine regions calculates to either 109 percent or 108 percent throughout the ten-year period.

Table 12 - SUMMER PEAK LOADS EXPRESSED AS PERCENTAGE OF PEAK LOADS FOR THE FOLLOWING WINTER, 1987-1996

Regions	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97
NPCC	103	103	104	104	104	105	105	105	105	106
MAAC	112	111	110	109	108	108	107	106	106	105
ECAR	102	102	103	103	102	102	102	102	102	102
SERC	101	101	102	102	102	102	102	101	102	102
MAIN	123	123	122	122	122	121	121	121	120	120
SPP	134	135	134	134	133	134	133	133	134	134
ERCOT	124	122	120	119	118	116	116	115	114	112
MAPP	112	113	112	112	112	112	112	112	112	112
WSCC	105	104	105	104	105	105	105	105	105	106
U.S. TOTAL	109	109	109	109	109	109	108	108	108	108

ANNUAL ENERGY REQUIREMENTS AND ANNUAL LOAD FACTORS 1987-1996

Calendar-year energy requirements by region and for the total of the lower forty-eight states are shown in Table 13. The corresponding annual load factors are given in Table 14. The energy requirement represents utility generation plus megawatthours received from all outside sources, including net imports from other countries and energy from certain industrial installations which are interconnected and coordinated with

the utility systems.

The present projections of energy requirements for the contiguous United States for the years 1988 through 1995 range between 0.1 and 1.6 percent below the values predicted in the 1985 ELECTRIC POWER ANNUAL REPORT. Changes in the regional projections for 1987 are so nearly offsetting that the national total is higher by only 0.1 percent.

MAAC raised its energy requirements projections by about 3 percent for each of the nine years, SERC by about 2 percent, and MAIN by less than 0.5 percent. The other six regions all lowered their projections. For 1996, the new furthest out year, the projected megawatthour requirement is 3.1 billion megawatthours. This represents an average annual increase of 2.1 percent between the first and tenth forecast years.

Table 13 - ANNUAL ENERGY REQUIREMENTS (Megawatthours in Thousands) 1987-1996

Regions	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Growth Rate*
NPCC	231,953	235,336	237,927	241,520	245,797	250,662	254,707	258,796	263,250	268,234	1.6%
MAAC	199,428	203,361	206,784	210,198	213,761	217,252	220,717	224,219	227,631	230,949	1.6%
ECAR	399,000	408,800	417,900	424,400	431,100	438,200	445,100	452,200	459,800	467,200	1.8%
SERC	551,263	569,121	584,521	599,224	614,525	627,764	639,388	653,003	667,297	681,115	2.4%
MAIN	179,198	183,660	186,779	190,227	193,674	197,287	200,676	204,140	207,535	211,089	1.8%
SPP	220,532	224,771	227,596	232,688	237,575	244,021	248,934	254,530	260,611	266,172	2.1%
ERCOT	195,815	199,855	205,984	213,555	221,403	229,076	237,481	245,931	254,805	263,409	3.3%
MAPP	111,280	113,897	114,701	117,065	119,010	121,113	123,542	125,733	127,990	130,316	1.8%
WSCC	500,574	512,678	523,093	533,391	543,463	553,707	563,280	575,378	585,590	598,002	2.0%
TOTAL U.S.	2,589,043	2,651,479	2,705,285	2,762,268	2,820,308	2,879,082	2,933,825	2,993,930	3,054,509	3,116,486	2.1%

* Compound annual growth rate from 1987 to 1996.

Table 14 - ANNUAL PERCENT LOAD FACTOR, 1987-1996

Regions	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
NPCC	63.4	63.4	63.6	63.8	64.0	63.9	64.1	64.1	64.1	64.0
MAAC	59.8	60.0	60.5	60.9	61.3	61.3	61.7	62.0	62.2	62.0
ECAR	65.1	65.4	65.6	65.5	65.5	65.3	65.3	65.3	65.2	65.0
SERC	59.5	59.5	59.7	59.8	60.0	60.0	60.1	60.2	60.3	60.1
MAIN	56.7	56.6	57.0	57.2	57.3	57.3	57.6	57.7	57.8	57.7
SPP	53.6	53.5	53.5	53.5	53.5	53.4	53.6	53.5	53.5	53.4
ERCOT	57.2	57.4	57.8	58.2	58.5	58.7	59.1	59.4	59.7	59.5
MAPP	57.9	58.0	58.2	58.3	58.6	58.6	58.9	59.0	59.1	59.0
WSCC	65.6	65.7	65.8	65.9	65.7	65.7	65.7	65.8	65.7	65.5
TOTAL U.S.	60.7	60.8	61.0	61.1	61.2	61.2	61.3	61.4	61.4	61.3

FUTURE EXPANSION PROGRAM AND SCHEDULED STEAM TURBINE-GENERATOR ADDITIONS BY SIZE

Table 16 shows that as of January 1, 1987, the electric utility systems serving the contiguous United States had on order with both domestic and foreign manufacturers, and scheduled for commercial operation during 1987 and later year, a total of 53.1 thousand megawatts. This included 10 hydraulic units of both conventional and pumped-storage type, totaling 1.3 thousand megawatts. The thermal units include 26 nuclear steam turbine-generators, 44 conventional steam turbine-generators, and 11 combustion turbine-generators. Some of this capacity is on site and being installed; the remainder is under manufacture or in the form of firm orders.

During 1987, 13 nuclear power units are scheduled for commercial operation. These 13 units have an aggregate capability of 13.9 thousand megawatts. As of January 1, 1987, there are 13 additional nuclear units on order and scheduled for commercial operation in 1988 and later in the contiguous United States, having an aggregate capability of 15.3 thousand megawatts. These units are included in the regional listing designated Table 17. An indeterminate number of units, amounting to several thousand megawatts, are also on order but are either awaiting their first assignment of a scheduled date of commercial operation by the utility systems, or were once scheduled and have since been removed from the expansion program.

It is probable that the majority of the orders in the second category (being held open as options by the manufacturers) will not be reactivated.

Table 15 shows that, of the total 51.2 thousand megawatts of steam turbine-generators on order as of January 1, 1987, and scheduled for service, nuclear and conventional units in sizes 700 megawatts and larger account for 75.7 percent of the total. Among the units in the less than 100 megawatt range, there are four geo-thermal units with a total capability of 232 megawatts, three solar units totaling 90 megawatts, and one coal-fired steam turbine-generator rated at 64 megawatts.

Table 15
NUMBER AND AGGREGATE CAPABILITY OF STEAM
TURBINE-GENERATORS IN THE EXPANSION PROGRAM
GROUPED ACCORDING TO SIZE RANGE
As of January 1, 1987

Size Range, MW	No. Of Units	Aggregate Capability MW	Percent of Total
1,300 MW and Larger	2	2,600	5.1
1,200 to 1,299	9	11,141	21.8
1,100 to 1,199	8	9,164	17.9
1,000 to 1,099	5	5,370	10.5
900 to 999	2	1,850	3.6
800 to 899	6	4,858	9.5
700 to 799	5	3,720	7.3
600 to 699	7	4,462	8.7
500 to 599	8	4,140	8.1
400 to 499	5	2,195	4.3
300 to 399	3	1,050	2.1
200 to 299	-	-	-
100 to 199	2	277	0.5
Under 100	8	386	0.8
TOTAL STEAM UNITS	70	51,213	100.0

Table 16 SCHEDULED ADDITIONS TO ELECTRIC GENERATING CAPABILITY BASED ON SCHEDULED DATES OF COMMERCIAL OPERATION AS OF JANUARY 1, 1987
In Terms of Net Expected Capability Ratings of the Units

	T H E R M A L								H Y D R A U L I C									
	Steam Turbine-Generators				Combustion Turbine-Generators				Diesel Engine-Generators				Conventional		Pumped-Storage		Total	
	Nuclear		Conventional															
	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW	No. of Units	MW		
TOTAL SCHEDULED	26	29,167	44	22,046	11	640	-	-	-	-	5	74	5	1,200	91	53,127		
SCHEDULED ADDITIONS BY YEARS - as of January 1, 1987																		
1987	13	13,851	10	3,664	1	25	-	-	-	-	1	26	-	-	25	17,566		
1988	2	2,191	6	2,427	10	615	-	-	-	-	4	48	1	200	23	5,481		
1989	2	2,400	4	1,974	-	-	-	-	-	-	-	-	-	-	6	4,374		
1990	2	2,205	1	55	-	-	-	-	-	-	-	-	-	-	3	2,260		
1991	-	-	6	4,281	-	-	-	-	-	-	-	-	4	1,000	10	5,281		
1992	-	-	2	1,240	-	-	-	-	-	-	-	-	-	-	2	1,240		
1993	-	-	1	750	-	-	-	-	-	-	-	-	-	-	1	750		
1994	-	-	4	2,385	-	-	-	-	-	-	-	-	-	-	4	2,385		
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1996	-	-	3	1,785	-	-	-	-	-	-	-	-	-	-	3	1,785		
1997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1998	-	-	1	645	-	-	-	-	-	-	-	-	-	-	1	645		
1999	7	8,520	5	2,500	-	-	-	-	-	-	-	-	-	-	12	11,020		
2005	-	-	1	340	-	-	-	-	-	-	-	-	-	-	1	340		
SCHEDULED ADDITIONS BY REGION - as of January 1, 1987																		
NPCC	3	3,039	-	-	-	-	-	-	-	-	-	-	-	-	3	3,039		
MAAC	1	1,055	1	640	-	-	-	-	-	-	-	-	-	-	2	1,695		
ECAR	3	3,131	4	3,695	-	-	-	-	-	-	-	-	-	-	7	6,826		
SERC	7	7,822	9	5,683	1	30	-	-	-	-	-	-	4	1,000	21	14,535		
MAIN	4	4,310	-	-	-	-	-	-	-	-	-	-	-	-	4	4,310		
SPP	1	1,250	1	540	-	-	-	-	-	-	1	6	-	-	3	1,796		
ERCOT	4	4,800	9	5,690	9	585	-	-	-	-	-	-	-	-	22	11,075		
MAPP	-	-	2	937	-	-	-	-	-	-	2	36	-	-	4	973		
WSCC	3	3,760	18	4,861	1	25	-	-	-	-	2	32	1	200	25	8,878		
SCHEDULED ADDITIONS BY OWNERSHIP - as of January 1, 1987																		
INVESTOR-OWNED	20	21,897	31	17,230	9	585	-	-	-	-	2	36	5	1,200	67	40,948		
FEDERAL	4	4,780	-	-	-	-	-	-	-	-	-	-	-	-	4	4,780		
MUNICIPAL	-	-	4	2,315	2	55	-	-	-	-	2	32	-	-	8	2,402		
COOPERATIVE	-	-	3	1,064	-	-	-	-	-	-	1	6	-	-	4	1,070		
STATE AND LOCAL	2	2,490	6	1,437	-	-	-	-	-	-	-	-	-	-	8	3,927		

Table 17 / SCHEDULED ADDITIONS TO ELECTRIC GENERATING CAPABILITY
Based on Scheduled Dates of Commercial Operation as of January 1, 1987

SYMBOLS:

Investor-Owned.....I
Federal.....F
Municipal.....M
Cooperative.....C
State & Local.....SL
Thermal
Conventional steam turbine-
generator.....T
Nuclear steam turbine-generator...N
Combustion turbine-generator.....G
Diesel engine-generator.....D

Hydraulic

Hydraulic turbine-generator.....H
Pumped-Storage
Pumped-storage turbine-
generator.....S
Reversible pumped-storage
turbine-generator.....R
Combined-Cycle
Combustion turbine-generator
for combined-cycle
operation.....GC
Conventional steam turbine-
generator for combined-cycle
operation.....TC

+ Denotes multiple ownership of the unit. In such cases, the name of the participating power system in whose service area the installation will be located is shown. In case the location does not fall within the service area of any of the participants, the name of the power system shown is the first in alphabetical order among the major participants.

o Denotes units added to the expansion program since July 1, 1986.

NOTES: Megawatts shown for individual generating units represent, in most cases, the net operating capability expected by the utility systems; in other cases they represent the manufacturer's nameplate rating of the unit.

TABLE 17 -- SCHEDULED ADDITIONS

REGION	SYSTEM	UNIT	OWNER-SHIP	TYPE	FOSSIL FUELS	MW of NET EXPECTED CAPABILITY	SKED YEAR OPTN
NPCC	LONG ISLAND LIGHTING CO	SHOREHAM NO 1	I	N		809	1987
NPCC	+NIAGARA MOHAWK POWER CORP	NINE MILE POINT NO 2	I	N		1,080	1987
NPCC	+PUBLIC SERVICE CO OF NEW HAMPSHIRE	SEABROOK NO 1	I	N		1,150	1987
3							
MAAC	BALTIMORE GAS & ELECTRIC CO	BRANDON SHORES NO 2	I	T	Oil/Coal	640	1992
MAAC	PHILADELPHIA ELECTRIC CO	LIMERICK NO 2	I	N		1,055	1990
2							
ECAR	AMERICAN ELECTRIC POWER CO	ROCKPORT NO 2	I	T	Coal	1,300	1988
ECAR	CINCINNATI GAS & ELECTRIC CO	ZIMMER	I	T	Coal	1,300	1991
ECAR	+CLEVELAND ELECTRIC ILLUMINATING CO	PERRY NO 1	I	N		1,205	1987
ECAR	+DETROIT EDISON COMPANY	FERMI NO 2	I	N		1,093	1987
ECAR	+DUQUESNE LIGHT COMPANY	BEAVER VALLEY NO 2	I	N		833	1987
ECAR	EAST KENTUCKY POWER COOP	SMITH NO 1	C	T	Coal	600	1992
ECAR	LOUISVILLE GAS & ELECTRIC CO	TRIMBLE COUNTY NO 1	I	T	Coal	495	1991
7							
SERC	ALABAMA POWER COMPANY	MILLER NO 3	I	T	Coal	666	1989
SERC	ALABAMA POWER COMPANY	MILLER NO 4	I	T	Coal	666	1991
SERC	CAROLINA POWER & LIGHT CO	HARRIS NO 1	I	N		900	1987
SERC	CAROLINA POWER & LIGHT CO	MAYO NO 2	I	T	Coal	720	1991
SERC	DUKE POWER COMPANY	BAD CREEK NO 1	I	R		250	1991
SERC	DUKE POWER COMPANY	BAD CREEK NO 2	I	R		250	1991
SERC	DUKE POWER COMPANY	BAD CREEK NO 3	I	R		250	1991
SERC	DUKE POWER COMPANY	BAD CREEK NO 4	I	R		250	1991
SERC	oFORT PIERCE FLORIDA	KING	M	G		30	1988
SERC	+GEORGIA POWER COMPANY	SCHERER NO 3	I	T	Coal	808	1987
SERC	+GEORGIA POWER COMPANY	SCHERER NO 4	I	T	Coal	808	1989
SERC	+GEORGIA POWER COMPANY	VOGTLE NO 1	I	N		1,071	1987
SERC	+GEORGIA POWER COMPANY	VOGTLE NO 2	I	N		1,071	1988
SERC	+JACKSONVILLE FLORIDA	ST JOHNS RIVER PARK 1	M	T	Coal	550	1987
SERC	+JACKSONVILLE FLORIDA	ST JOHNS RIVER PARK 2	M	T	Coal	550	1988
SERC	+ORLANDO FLORIDA	STANTON NO 1	M	T	Coal	415	1987
SERC	SOUTH CAROLINA PUBLIC SERVICE AUTHORITY	CROSS NO 1	SL	T	Coal	500	1999
SERC	TENNESSEE VALLEY AUTHORITY	BELLEFONTE NO 1	F	N		1,213	1999
SERC	TENNESSEE VALLEY AUTHORITY	BELLEFONTE NO 2	F	N		1,213	1999
SERC	TENNESSEE VALLEY AUTHORITY	WATTS BAR NO 1	F	N		1,177	1999
SERC	TENNESSEE VALLEY AUTHORITY	WATTS BAR NO 2	F	N		1,177	1999

REGION	S Y S T E M	U N I T	OWNER- SHIP	TYPE	FOSSIL FUELS	MW of NET EXPECTED CAPABILITY	SKED YEAR OPTN
MAIN	COMMONWEALTH EDISON CO	BRAIDWOOD NO 1	I	N		1,120	1987
MAIN	COMMONWEALTH EDISON CO	BRAIDWOOD NO 2	I	N		1,120	1988
MAIN	COMMONWEALTH EDISON CO	BYRON NO 2	I	N		1,120	1987
MAIN 4	+ILLINOIS POWER COMPANY	CLINTON NO 1	I	N		950	1987

SPP	ARKANSAS ELECTRIC COOP	LOCK & DAM NO 13 NO 1	C	H		6	1988
SPP	GULF STATES UTILITIES	NELSON NO 5	I	T	Coal	540	1996
SPP 3	+MISSISSIPPI POWER & LIGHT CO	GRAND GULF NO 2	I	N		1,250	1999

ERCOT	+BRAZOS ELECTRIC POWER COOP	SAN MIGUEL NO 2	C	T	Coal/Oil	400	1994
ERCOT	+CENTRAL POWER & LIGHT CO	COLETO CREEK NO 2	I	T	Coal	600	1996
ERCOT	HOUSTON LIGHTING & POWER CO	MALAKOFF NO 1	I	T	Coal	645	1996
ERCOT	HOUSTON LIGHTING & POWER CO	MALAKOFF NO 2	I	T	Coal	645	1998
ERCOT	HOUSTON LIGHTING & POWER CO	SOUTH TEXAS NO 1	I	N		1,250	1987
ERCOT	HOUSTON LIGHTING & POWER CO	SOUTH TEXAS NO 2	I	N		1,250	1989
ERCOT	+LOWER COLORADO RIVER AUTHORITY	FAYETTE NO 3	SL	T	Coal	400	1988
ERCOT	+TEXAS UTILITIES CO SYSTEM	COMANCHE PEAK NO 1	I	N		1,150	1989
ERCOT	+TEXAS UTILITIES CO SYSTEM	COMANCHE PEAK NO 2	I	N		1,150	1990
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB A1	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB A2	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB A3	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B1	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B2	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B3	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B4	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B5	I	G		65	1988
ERCOT	TEXAS UTILITIES CO SYSTEM	COMBUSTION TURB B6	I	G		65	1988
ERCOT	+TEXAS UTILITIES CO SYSTEM	FOREST GROVE NO 1	I	T	Coal	750	1994
ERCOT	+TEXAS UTILITIES CO SYSTEM	MARTIN LAKE NO 4	I	T	Coal	750	1994
ERCOT	+TEXAS UTILITIES CO SYSTEM	TWIN OAK NO 1	I	T	Coal	750	1991
ERCOT 22	+TEXAS UTILITIES CO SYSTEM	TWIN OAK NO 2	I	T	Coal	750	1993

MAPP	NORTHERN STATES POWER CO	JIM FALLS NO 1	I	H		18	1988
MAPP	NORTHERN STATES POWER CO	JIM FALLS NO 2	I	H		18	1988
MAPP	NORTHERN STATES POWER CO	RIVERSIDE 6 & 7 REBUILD	I	T	Coal	137	1987
MAPP 4	+NORTHERN STATES POWER CO	SHERBURNE CNTY NO 3	I	T	Coal	800	1987

REGION	S Y S T E M	U N I T	OWNER- SHIP	TYPE	FOSSIL FUELS	MW of NET EXPECTED CAPABILITY	SKED YEAR OPTN
WSCC	ARIZONA PUBLIC SERVICE CO	CHOLLA NO 5	I	T	Coal	340	2005
WSCC	+ARIZONA PUBLIC SERVICE CO	PALO VERDE NO 3	I	N		1,270	1987
WSCC	CALIFORNIA DEPT OF WATER RESOURCES	SOUTH GEYSERS	SL	T	Geothermal	55	1990
WSCC	CENTRAL CALIFORNIA POWER AGENCY	COLDWATER NO 1	SL	T	Geothermal	66	1988
WSCC	CENTRAL CALIFORNIA POWER AGENCY	COLDWATER NO 2	SL	T	Geothermal	66	1988
WSCC	COLORADO-UTE ELECTRIC ASSOCIATION	NUCLA NO 4	C	T	Coal	64	1987
WSCC	+LOS ANGELES CALIFORNIA	INTERMOUNTAIN NO 2	M	T	Coal	800	1987
WSCC	PACIFIC GAS & ELECTRIC COMPANY	GEYSERS NO 21	I	T	Geothermal	140	1989
WSCC	PUBLIC SERVICE CO OF COLORADO	PAWNEE NO 2	I	T	Coal	485	1994
WSCC	+PUBLIC SERVICE CO OF NEW MEXICO	NEW MEXICO STATION NO 1	I	T	Coal	500	1999
WSCC	PUBLIC SERVICE CO OF NEW MEXICO	NEW MEXICO STATION NO 2	I	T	Coal	500	1999
WSCC	PUBLIC SERVICE CO OF NEW MEXICO	NEW MEXICO STATION NO 3	I	T	Coal	500	1999
WSCC	PUBLIC SERVICE CO OF NEW MEXICO	NEW MEXICO STATION NO 4	I	T	Coal	500	1999
WSCC	SALT RIVER PROJECT	CORONADO NO 3	SL	T	Coal	350	1991
WSCC	SAN DIEGO GAS & ELECTRIC COMPANY	HEBER NO 2	I	T	Geothermal	45	1988
WSCC	SANTA CLARA CALIFORNIA	BLACK BUTTE DAM	M	H		6	1988
WSCC	SANTA CLARA CALIFORNIA	COMBUSTION TURBINE NO 2	M	G		25	1987
WSCC	SOUTHERN CALIFORNIA EDISON CO	BALSAM MEADOW	I	R		200	1988
WSCC	SOUTHERN CALIFORNIA EDISON CO	LUZ - SEGS 3	I	T	Solar	30	1987
WSCC	SOUTHERN CALIFORNIA EDISON CO	LUZ - SEGS 4	I	T	Solar	30	1987
WSCC	SOUTHERN CALIFORNIA EDISON CO	LUZ - SEGS 5	I	T	Solar	30	1987
WSCC	TACOMA WASHINGTON	MAIN CANAL HEADWORKS	M	H		26	1987
WSCC	TUCSON ELECTRIC POWER COMPANY	SPRINGVILLE NO 2	I	T	Coal	360	1989
WSCC	+WASHINGTON PUBLIC POWER SUPPLY SYS	WNP NO 3	SL	N		1,240	1999
WSCC	+WASHINGTON PUBLIC POWER SUPPLY SYS	WNP NO 1	SL	N		1,250	1999

25

91 units: 53,127 MW

PART III. MANUFACTURE OF HEAVY ELECTRIC POWER EQUIPMENT (HISTORICAL AND SCHEDULED)

Data in this section of the report relate to the manufacture in the United States of heavy electric power equipment for U.S. electric utility systems, U.S. Industrials and for export to customers outside the United States. Information is also included on actual and scheduled imports of such equipment by U.S. electric utility systems.

Orders placed with domestic and foreign manufacturers during 1986 for heavy electric power equipment by U.S. electric utility systems are shown in the accompanying order synopsis table (Table 18), together with corresponding information for the previous four years.

Detailed data, as of January 1, 1987 concerning 1986 orders, shipments, scheduled shipments, and total production backlogs of domestic manufacturers for the three customer classes are shown in the series of tables that follow, along with analogous information on imports of certain types of equipment by U.S. electric utility systems only.

During 1986 orders for new steam and hydraulic electric generating units placed with domestic manufacturers totaled 18 machines aggregating 1,890 megawatts. This is the first year since World War II that no steam or hydraulic units have been ordered by U.S. electric utility systems.

U.S. Industrials accounted for 15.7 percent of the total of hydro and steam capacity ordered, and export orders accounted for the other 84.3 percent. Production by domestic manufacturers during the year 1986 amounted to 2.3 thousand megawatts, of which 975 megawatts were delivered to U.S. electric utility systems. The total production scheduled as of January 1, 1987, for all classes of customers amounts to 103 units totaling 43.9 thousand megawatts. The manufacturing schedule for 1987 totals 2.6 thousand megawatts. The 1988 and later schedule, up to now, calls for the production of 71 units totaling 41.3 thousand megawatts.

Table 18 - CAPACITIES OF VARIOUS TYPES OF EQUIPMENT ORDERED BY U.S. ELECTRIC UTILITY SYSTEMS FROM DOMESTIC AND FOREIGN MANUFACTURERS

	1982 ^a	1983	1984	1985	1986
Electric Generating Units (4,000 kW and Larger)					
Steam Turbine-Generators, kW					
Conventional	--	591,465	683,100	1,379,454	--
Nuclear	--	--	--	--	--
Geothermal, kW	93,500	110,000	139,240 (a)	168,000 (a)	--
Solar, kW	--	14,700	30,000	90,000	--
Combustion Turbine-Generators, kW	35,790	75,000 (a)	162,000	24,800	751,800
Generators for Hydraulic Turbines, kW	279,326 (a)	869,367 (a)	--	69,200	--
TOTALS	408,616 (a)	1,660,532 (a)	1,014,340 (a)	1,731,454 (a)	751,800
Steam Generators, 1,000 Lb Steam Per Hour	1,000	4,700	3,900	--	9,775
Nuclear Power Reactors (50,000 kW and Larger)	--	--	--	--	--
Hydraulic Turbines, Hp	--	--	--	--	77,200 (a)
Power Transformers, Mva (b)	78,003	69,495	65,688	65,037	79,662

(a) Includes equipment on order with foreign manufacturers.

(b) Includes U.S. industrials.

Table 19 - STEAM AND HYDRAULIC UNITS* (4,000 kW and Larger)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	8	-	58	58	-
kW	975,240	-	34,639,625	34,639,625	-
U.S. Industrials					
Units	21	26	2	28	12
kW	471,400	905,885	177,875	1,083,760	296,800
Exports from U.S.					
Units	6	6	11	17	6
kW	841,000	1,664,496	6,494,000	8,158,496	1,593,000
Total					
Units	35	32	71	103	18
kW	2,287,640	2,570,381	41,311,500	43,881,881	1,889,800

*Does not include combustion turbine-generators, but does include steam turbine-generators for nuclear power plants.

Table 20 MANUFACTURE OF STEAM TURBINE-GENERATORS—4,000 kW and Larger

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	8	-	58	58	-
kW	975,240	-	34,639,625	34,639,625	-
U.S. Industrials					
Units	21	26	2	28	12
kW	471,400	905,885	177,875	1,083,760	296,800
Exports from U.S.					
Units	7	6	11	17	6
kW	1,547,496	1,664,496	6,494,000	8,158,496	1,593,000
Total					
Units	36	32	71	103	18
kW	2,994,136	2,570,381	41,311,500	43,881,881	1,889,800

Table 20 A - MANUFACTURE OF CONVENTIONAL STEAM TURBINE-GENERATORS
(4,000 kW and Larger)(Included in Table 20)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	8	-	57	57	-
kW	975,240	-	33,689,603	33,689,603	-
U.S. Industrials					
Units	21	26	2	28	12
kW	471,400	905,885	177,875	1,083,760	296,800
Exports from U.S.					
Units	6	5	8	13	6
kW	841,000	958,000	4,394,000	5,352,000	1,593,000
Total					
Units	35	31	67	98	18
kW	2,287,640	1,863,885	38,261,478	40,125,363	1,889,800
U.S.E.U.S. Orders to Foreign Manufacturers (Imports)					
Units	2	2	1	3	-
kW	132,540	518,000	657,000	1,175,000	-

Table 20 B - MANUFACTURE OF NUCLEAR STEAM TURBINE-GENERATORS
(50,000 kWe and Larger)(Included in Table 20)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	-	-	1	1	-
kW	-	-	950,022	950,022	-
U.S. Industrials					
Units	-	-	-	-	-
kW	-	-	-	-	-
Exports from U.S.					
Units	1	1	3	4	-
kW	706,496	706,496	2,100,000	2,806,496	-
Total					
Units	1	1	4	5	-
kW	706,496	706,496	3,050,022	3,756,518	-
U.S.E.U.S. Orders to Foreign Manufacturers (Imports)					
Units	-	-	-	-	-
kW	-	-	-	-	-

Table 21 - MANUFACTURE OF GENERATORS FOR HYDRAULIC TURBINES* (4,000 kW and Larger)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	-	-	-	-	-
kW	-	-	-	-	-
U.S. Industrials					
Units	-	-	-	-	-
kW	-	-	-	-	-
Exports from U.S.					
Units	-	-	-	-	-
kW	-	-	-	-	-
Total					
Units	-	-	-	-	-
kW	-	-	-	-	-
U.S.E.U.S. Orders to Foreign Manufacturers (Imports)					
Units	1	4	4	8	-
kW	200,000	74,800	1,126,800	1,201,600	-

*Includes generators for pumped-storage plants.

Table 22 - MANUFACTURE OF CONVENTIONAL STEAM GENERATORS (450 Psi Pressure and Higher)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	2	1	16	17	1
M Lb/Hr	9,130	8,200	85,978	94,178	9,775
U.S. Industrials					
Units	9	15	-	15	17
M Lb/Hr	996	3,309	-	3,309	3,609
Exports from U.S.					
Units	1	-	-	-	-
M Lb/Hr	3,748	-	-	-	-
Total					
Units	12	16	16	32	18
M Lb/Hr	13,874	11,509	85,978	97,487	13,384

Table 23 - MANUFACTURE OF HYDRAULIC TURBINES* (5,000 Horsepower and Larger)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	-	-	4	4	-
Hp	-	-	1,380,000	1,380,000	-
U.S. Industrials					
Units	3	-	-	-	-
Hp	70,480	-	-	-	-
Exports from U.S.					
Units	-	-	-	-	-
Hp	-	-	-	-	-
Total					
Units	3	-	4	4	-
Hp	70,480	-	1,380,000	1,380,000	-
U.S.E.U.S. Orders to Foreign Manufacturers (Imports)					
Units	1	3	3	6	5
Hp	235,000	81,800	18,000	99,800	77,200

*Includes hydraulic turbines for pumped-storage plants.

Table 24 - MANUFACTURE OF COMBUSTION TURBINE-GENERATORS (4,000 kW and Larger)

Customer	Shipped	Scheduled as of January 1, 1987		Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	1	9	1	10	11
kW	24,800	702,000	25,000	727,000	751,800
U.S. Industrials					
Units	6	18	-	18	11
kW	250,100	958,000	-	958,000	378,200
Exports from U.S.					
Units	11	8	6	14	6
kW	622,500	450,700	659,400	1,110,100	157,600
Total					
Units	18	35	7	42	28
kW	897,400	2,110,700	684,400	2,795,100	1,287,600
U.S.E.U.S. Orders to Foreign Manufacturers (Imports)					
Units	-	-	-	-	-
kW	-	-	-	-	-

Table 25 - MANUFACTURE OF NUCLEAR REACTORS (50,000 kWe and Larger)

Customer	Completed	Scheduled as of January 1, 1987		Total Scheduled for Completion as of 1-1-87	New Orders Booked 1986
	1986	1987	1988 and Later		
U.S. Electric Utility Systems					
Units	7	13	16	29	-
kWe	8,002,000	14,260,000	18,450,000	32,710,000	-
Exports from U.S.					
Units	4	2	11	13	-
kWe	3,758,000	1,870,000	9,711,000	11,581,000	-
Total					
Units	11	15	27	42	-
kWe	11,760,000	16,130,000	28,161,000	44,291,000	-

Table 26 - MANUFACTURE OF POWER TRANSFORMERS (501 kVA and Larger)

		Shipped		Scheduled as of January 1, 1987						Total Scheduled for Shipment as of 1-1-87	New Orders Booked 1986
Customer		1986	1987	1988	1989	1990	1991	1992	1993 and Later		
501 to 10,000 kVA											
U.S. Electric Utility Systems and U.S. Industrials	(Units MVA)	7,003 13,645	1,679 3,380	27 89	6 6	13 42	-	-	-	1,725 3,517	7,122 13,436
Exports from U.S.	(Units MVA)	121 324	23 81	-	-	-	-	-	-	23 81	121 270
TOTAL	(Units MVA)	7,124 13,969	1,702 3,462	27 89	6 6	13 42	-	-	-	1,748 3,598	7,243 13,707
10,001 to 30,000 kVA											
U.S. Electric Utility Systems and U.S. Industrials	(Units MVA)	695 17,704	240 5,258	11 294	3 120	-	-	-	-	254 5,672	650 13,469
Exports from U.S.	(Units MVA)	9 329	-	-	-	-	-	-	-	-	8 131
TOTAL	(Units MVA)	704 18,033	240 5,258	11 294	3 120	-	-	-	-	254 5,672	658 13,600
30,001 to 100,000 kVA											
U.S. Electric Utility Systems and U.S. Industrials	(Units MVA)	267 17,337	175 10,562	8 668	3 183	4 205	-	-	6 318	196 11,936	251 16,058
Exports from U.S.	(Units MVA)	2 214	-	-	-	-	-	-	-	-	1 47
TOTAL	(Units MVA)	269 17,551	175 10,562	8 668	3 183	4 205	-	-	6 318	196 11,936	252 16,105
100,000 kVA and Larger											
U.S. Electric Utility Systems and U.S. Industrials	(Units MVA)	67 25,038	49 14,834	5 1,544	1 858	5 2,784	2 1,673	-	-	62 21,693	102 36,697
Exports from U.S.	(Units MVA)	4 768	-	-	-	-	-	-	-	-	-
TOTAL	(Units MVA)	71 25,806	49 14,834	5 1,544	1 858	5 2,784	2 1,673	-	-	62 21,693	102 36,697
Total (501 kVA and Larger)											
U.S. Electric Utility Systems and U.S. Industrials	(Units MVA)	8,032 73,724	2,143 34,034	51 2,595	13 1,168	22 3,031	2 1,673	-	6 318	2,237 42,819	8,125 79,662
Exports from U.S.	(Units MVA)	136 1,635	23 81	-	-	-	-	-	-	23 81	130 448
TOTAL	(Units MVA)	8,168 75,359	2,166 34,116	51 2,595	13 1,168	22 3,031	2 1,673	-	6 318	2,260 42,900	8,255 80,110

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